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OUR ENGLISH PAGE

New Views on the Universe.

(新しい宇宙觀)

Finite but Expanding.

Last spring Dr. J. H. Jeans, lecturing at the Royal Institution, presented a coherent picture of our universe. His unusual combination of mathematical analysis with the power of logical deduction, which, when exercised in unfamiliar fields, we call scientific imagination, made the picture simple and vivid. Astronomers to-day use telescopes ranging in aperture from about one-fifth of an inch to about one hundred inches. Were the field of stars to which these were presented uniform and infinite, the numbers revealed would be proportional to the cube of the telescopic aperture. With the naked eye we see about 5,000 stars; with a one-inch telescope about 100,000; with a ten-inch about 5,000,000; with a 100-inch about 100,000,000. The numbers do not increase as they would, were the stars an infinite multitude. Our universe, so far as observation goes, is limited to about 1,500,000,000 stars, thinning out definitely with their distance from the sun, which is approximately in the centre.

The dimensions of the universe can be stated. The planets Venus and Mars approach the earth respectively to 25,000,000 and 35,000,000 miles; Mercury does not come nearer us than 47,000,000 miles; and the sun at its nearest is 93,000,000 miles distant. The remaining planets follow at distances ranging up to 2,800,000,000 miles, the radius of the orbit of Neptune. Then comes a great gap, the nearest of the stars being 24,000,000 million miles away. Sirius, the brightest star, is 50,000,000 million miles away. The farthest object the distance of which is known with any accuracy is a star-cluster 25,000 times as distant as Sirius, so remote that its light, travelling at about 180,000 miles a second, takes 200,000 years to reach us. Still farther off, at a distance estimated rather than known, is a star cluster, 6,000,000 million miles away, the light of which takes a million years to reach us. Dr. Jeans supplied an image of the immense but finite size of the universe. Let a threepenny piece represent Neptune's orbit, within which our solar system lies. On this scale the earth's orbit will be a pin-head, or full-stop, of radius of 100th of an inch, the sun will be an invisible speck of dust, the earth an ultra-microscopic particle 1,000,000th of an inch in diameter. And the universe will be as the size of the whole earth to the threepenny piece.

In the stellar universe there are very many nebulæ, gigantic in size far beyond the estimations of Laplace, but of regular shape, incredible tenuity, and rotating about their shortest axes. These can be arranged in an evolutionary series leading to "spiral" nebulæ also rotating but throwing off at either end of their longest axis two gigantic filaments, which, in turn, are condensing into stars. Some of the stars are single, others have divided into twins of almost equal size.